

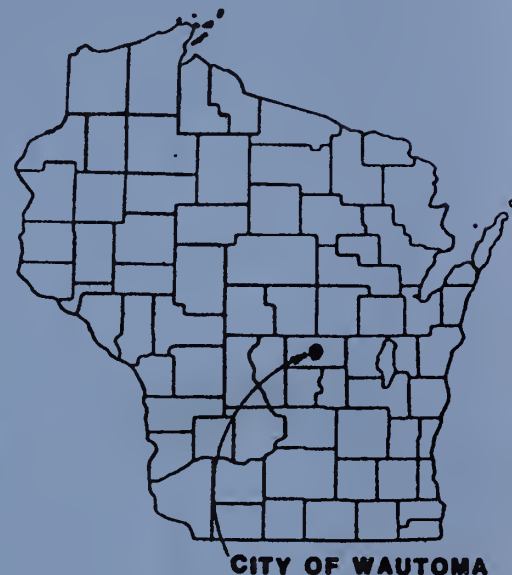
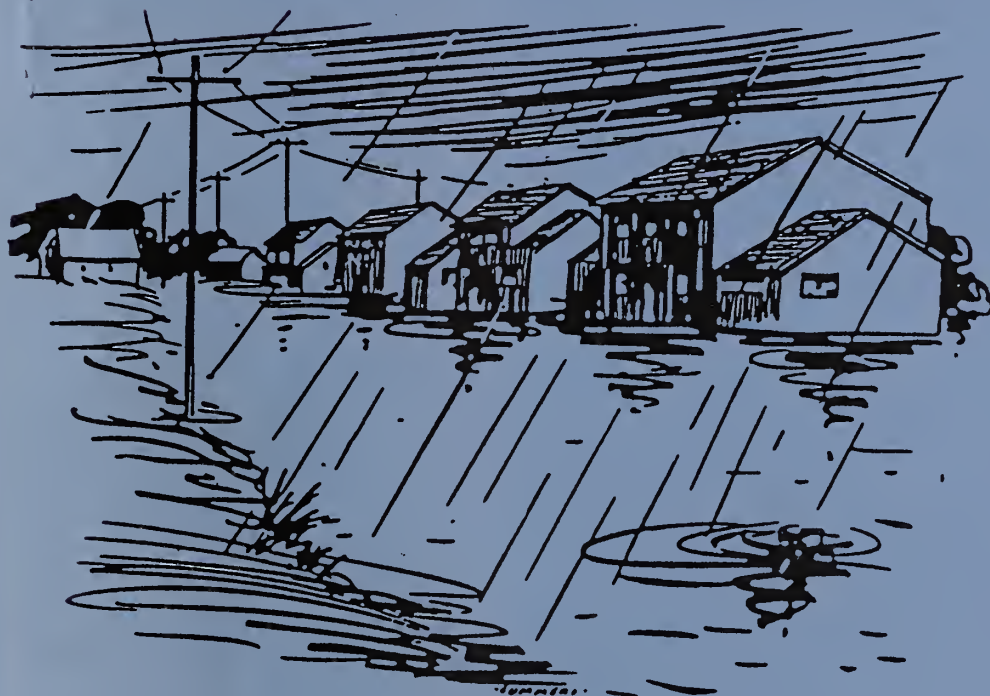
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FLOODPLAIN MANAGEMENT STUDY

CITY OF WAUTOMA

WAUSHARA COUNTY, WISCONSIN



PREPARED BY THE

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

MADISON, WISCONSIN

IN COOPERATION WITH

WAUSHARA COUNTY, WISCONSIN

AND THE

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

NOVEMBER 1985

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City of Wautoma Floodplain Management Study

Introduction

The purpose of this study is to define the flood characteristics of the White River and Bird Creek within the corporate limits of the city. The City of Wautoma requested the study through Waushara County and the Wisconsin Department of Natural Resources (DNR).

This report is prepared for use by the local people in planning the use and regulation of the floodplain within the city.

The 100-year floodplain has been delineated. The high water elevations and floodplain deliniations are based on 5-year projected land use of the watershed, stream, floodplain, and existing road crossings.

The Soil Conservation Service carries out flood hazard studies in accordance with Federal Level Recommendation 3 of "A Unified National Program for Floodplain Management," and Section 6 of Public Law 83-566. The principles contained in Executive Order 11988, Floodplain Management, are addressed in this part.

In Wisconsin, the Soil Conservation Service coordinates floodplain management studies with the Wisconsin DNR, through a joint coordination agreement entered into in October 1978. The Wisconsin Water Resources Act (Chapter 614, Laws of Wisconsin, 1965) authorizes the DNR, Division of Enforcement, to establish and upgrade minimum standards for floodplain regulations.

Study Area Description

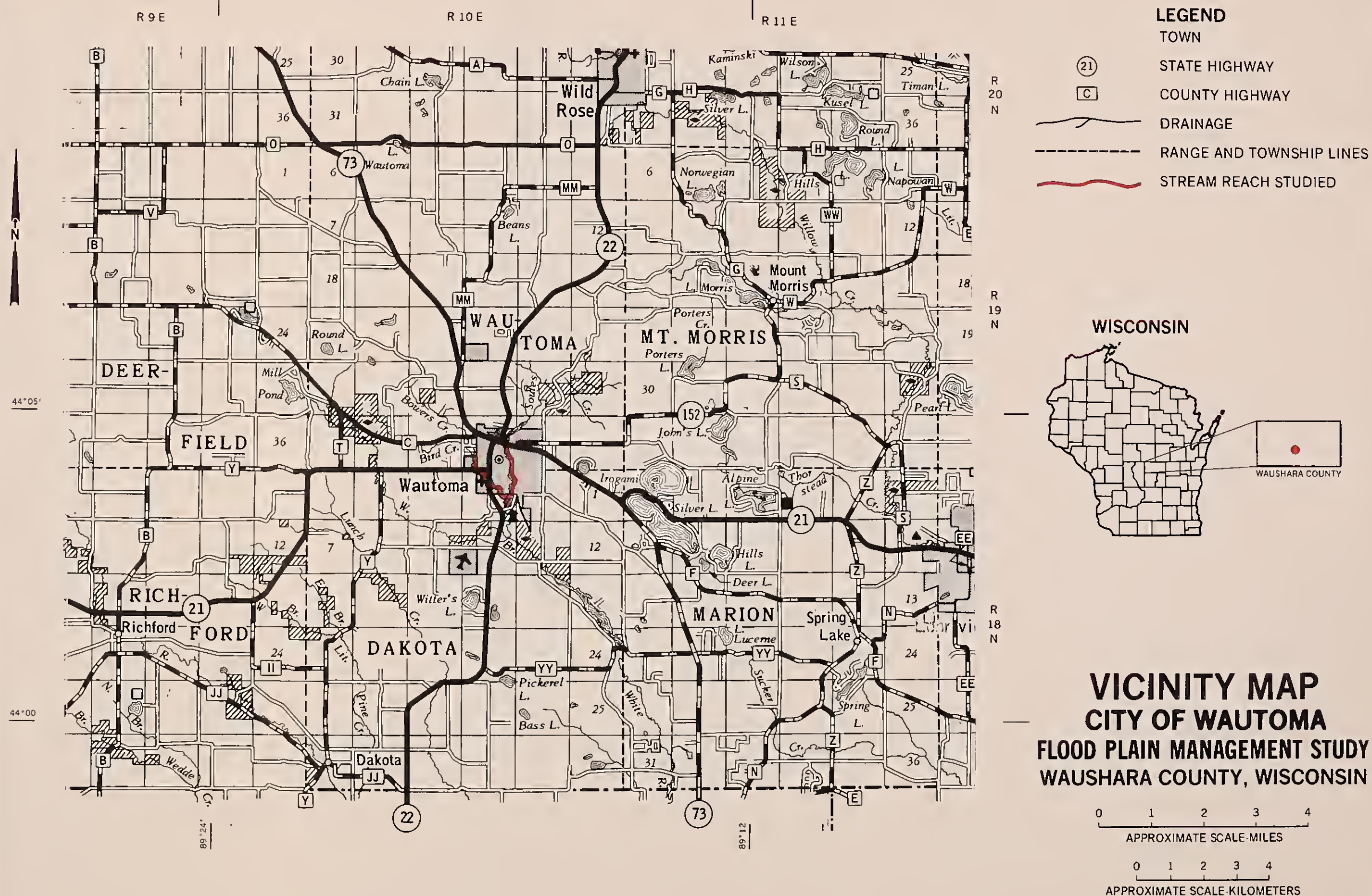
The city of Wautoma is located in south central Waushara County. Waushara County is located in central Wisconsin. The study area consists of the floodplain adjacent to 2.08 miles of the White River and 1.7 miles of Bird Creek within the corporate limits.

The profiles were started at the bridge on S. Fair Street and ended at the mill pond for the White River and River Road for Bird Creek.

The drainage area above the mill pond consists of 9.97 square miles. The drainage area at the southern corporate limits is 10.78 square miles. Bird Creek has a contributing drainage area of 3.3 square miles at the upper study limit and 3.97 square miles at the confluence with the White River. The total drainage area for Bird Creek is 4.14 square miles.

The climate is typically continental. January temperatures average 19°F. July, the warmest month, has an average temperature of 72°F. Precipitation averages 29 inches per year.

The soils of the watershed consist of the Plainfield-Meehan-Kingsville association on the uplands, outwash plain and stream terraces. Large areas of Adrian muck occur in the central area of Bowers Creek and above the mill pond on Soules Creek. The Plainfield-Meehan-Kingsville association consists of nearly level and gently sloping, excessively drained and somewhat excessively drained,



SOURCE:
1984 GENERAL HIGHWAY MAP AND
INFORMATION FROM SCS FIELD PERSONNEL
POLYCONIC PROJECTION

sandy soils on outwash plains, stream terraces, and uplands. The Adrian series consists of very poorly drained soils formed in deposits of organic material over sand to depths of 34 inches.

Natural and Beneficial Floodplain Values

The White River portion of the study area consists of the mill pond and adjacent shrub wetland at the north end, the tree-lined river through the city, and the southern end of scattered trees and a shrub wetland.

Bird Creek is also tree-lined with a tree and shrub wetland west of the high school.

Both of these streams are classified as Class I trout streams. Floodplain decisions should be made which protect the scenic values of these streams as well as preserving good water quality and the fishery value.

There are several natural values associated with the undeveloped portion of the floodplain. Large volumes of water are stored on the floodplain during peak flows. The natural areas, particularly the wetlands consisting of dogwood, alder, willow, sedges, and grasses provide habitat for a variety of wildlife species. The vegetation helps filter pollutants from runoff. Streamside vegetation helps shade the stream to keep temperature cool and overhanging brush and grass provides cover for fish.

There are no records indicating the presence of threatened or endangered plants or animals in the area. There is no prime farmland. The National Register of Historic Places lists the Waushara County Courthouse and Jail as having local historical significance, however, it is not in the floodplain.

Flooding Problems

Although numerous storm and runoff events have been recorded in the Wautoma area, no serious flooding events have occurred in the city. Flooding events recalled by local residents are as follows: In 1905 water overtopped highway 21 - 73 and ran east to Ste. Marie Street then south to the river. The highway has been raised since then. In 1930 the Division Street bridge was washed out. The present bridge has not flooded. In the late 30's water overtopped the road at 234 Water Street. The water was about 1 foot deep 200 feet east of the bridge, the road level has changed little, however, a house with basement was placed north of the flooding site on about 3 feet of fill. In June 1940 a four day rain caused water to flow about one foot deep over Elm Street. The street overtopped about 150 feet east of the bridge. A garage later built at 328 Elm Street has had water to the garage on occasion since 1940. The garden behind 416 Elm Street was slightly flooded in 1940. Water has been to the level of the sewer pipe under the Elm Street bridge several times. Two inches of rain in February 1973 caused the mill pond to overtop by 2 inches. Water crossed the city parking lot and Highway 21, flowing south to marsh area along the location of the old channel from the grist mill. No firm high water mark exist in the city.

A new automatic sluice gate is being installed for an outlet to the mill pond, which should alleviate the overtopping of the pond.

Existing Floodplain Management

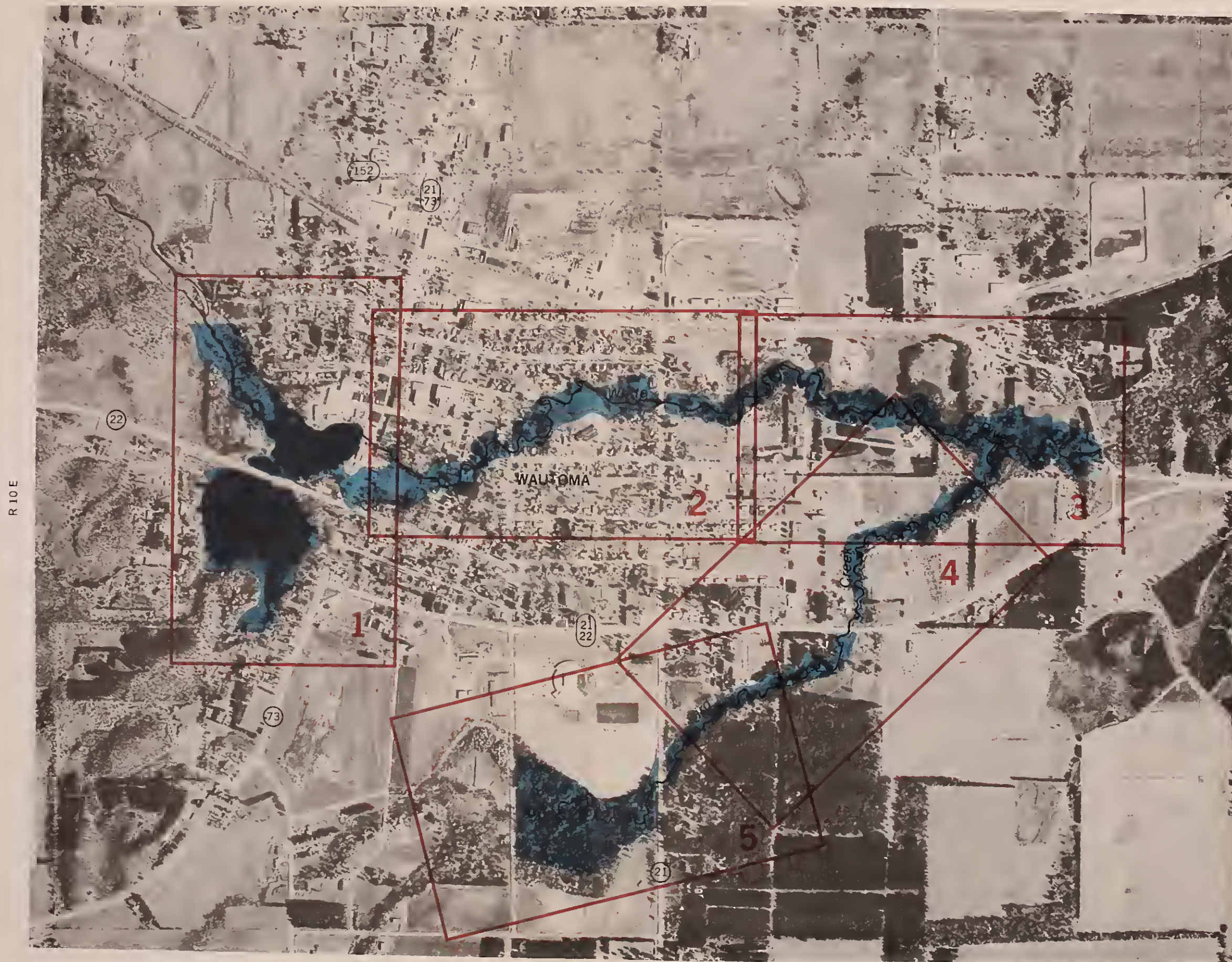
The City of Wautoma does not have a floodplain ordinance. The city is under the emergency phase of the National Flood Insurance Program.

Alternatives for Mitigating Flood Damages to Existing and Future Development

- A. The city will incorporate the floodplain maps from this study into a floodplain ordinance and provide enforcement.
- B. The city can apply existing standards set forth in the city's subdivision control ordinance to regulate development in nonsuitable areas and minimize erosion and diffused surface water runoff within the watershed.
- C. The city can establish conservancy districts for those areas highly conducive to erosion and unsuitable for development.

Appendix A

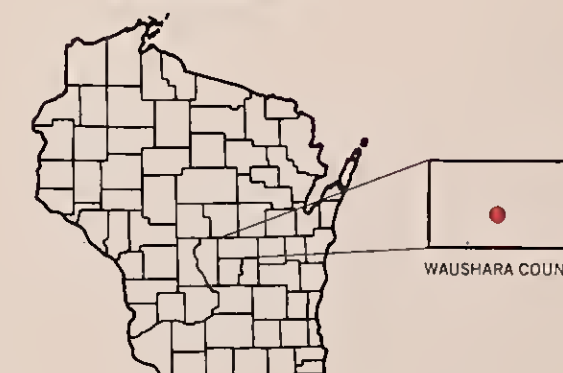
FLOOD BOUNDARY MAPS



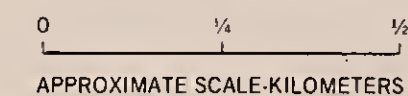
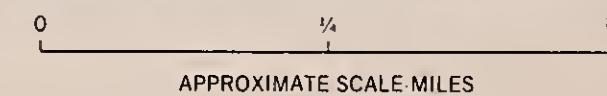
LEGEND

- 1 SHEET COVERAGE
- FLOOD PLAIN AREA
(100 AND 500 YEAR
FREQUENCY FLOODS)
- STREAM CHANNEL

WISCONSIN




INDEX TO MAP SHEETS CITY OF WAUTOMA FLOOD PLAIN MANAGEMENT STUDY WAUSHARA COUNTY, WISCONSIN








LEGEND

 100 Year Flood Hazard Area

 500 Year Flood Hazard Area

 Stream Channel

 Valley Section

RM 2  Reference Mark

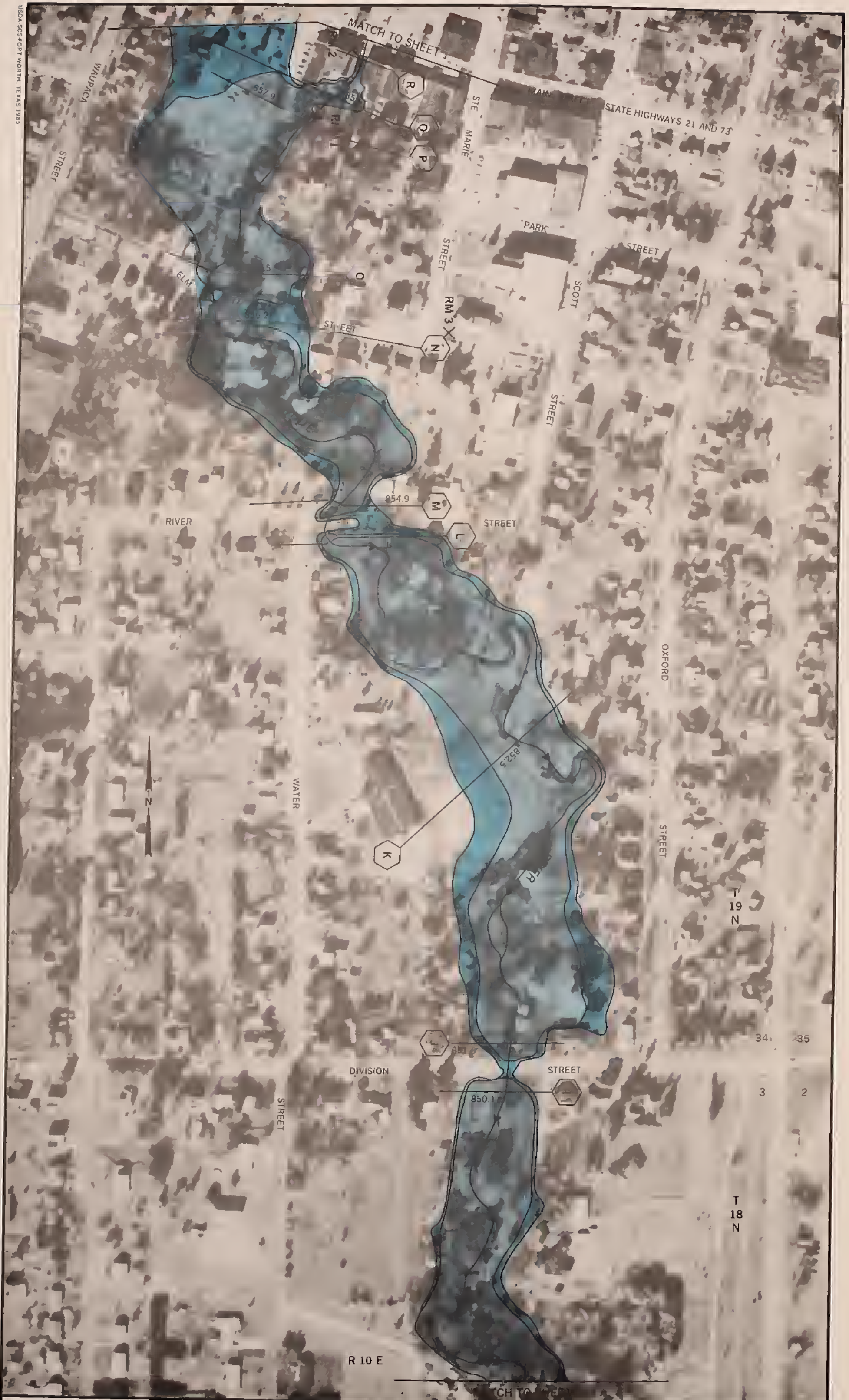
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FROM ACTUAL LOCATIONS ON THE GROUND
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC
DISPLACEMENT THE PHOTOGRAPHIC IMAGE
MAY VARY FROM TRUE GROUND LOCATION.



1977 ASCS Photography

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CITY OF WAUTOMA
FLOOD PLAIN MANAGEMENT STUDY
WAUSHARA COUNTY, WISCONSIN

FLOOD HAZARD AREA
WAUTOMA POND



LEGEND

- 100 Year Flood Hazard Area
- 500 Year Flood Hazard Area
- Stream Channel

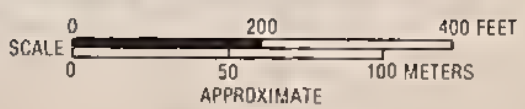


Valley Section

RM 2

Reference Mark

NOTE:
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FROM ACTUAL LOCATIONS ON THE GROUND
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC
DISPLACEMENT THE PHOTOGRAPHIC IMAGE
MAY VARY FROM TRUE GROUND LOCATION






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FLOOD HAZARD AREA
WHITE RIVER



LEGEND

- LEGEND**
-  100 Year Flood Hazard Area
-  500 Year Flood Hazard Area
-  Stream Channel



Valley Section

RM 2 X Reference Mark

NOTE
LIMITS OF FLOODING SHOWN MAY VARY
FROM ACTUAL LOCATIONS ON THE GROUND
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC
DISPLACEMENT THE PHOTOGRAPHIC IMAGE
MAY VARY FROM TRUE GROUND LOCATION

0 200 400 FEET

0 50 100 METERS

APPROXIMATE

1977 ASCS Photography

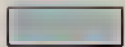
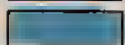



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WAUSHARA COUNTY, WISCONSIN

FLOOD HAZARD AREA

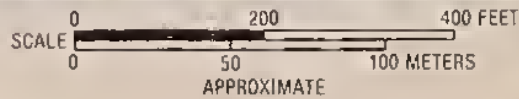
WHITE RIVER AND BIRD CREEK



LEGEND

-  100 Year Flood Hazard Area
-  500 Year Flood Hazard Area
-  Stream Channel
-  Valley Section
-  Reference Mark

NOTE:
LIMITS OF FLOODING SHOWN MAY VARY
FROM ACTUAL LOCATIONS ON THE GROUND
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC
DISPLACEMENT THE PHOTOGRAPHIC IMAGE
MAY VARY FROM TRUE GROUND LOCATION



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FLOOD HAZARD AREA
BIRD CREEK



LEGEND



100 Year Flood Hazard Area
500 Year Flood Hazard Area



Stream Channel



Valley Section

RM 2



Reference Mark

NOTE:
LIMITS OF FLOODING SHOWN MAY VARY
FROM ACTUAL LOCATIONS ON THE GROUND
AND DUE TO INHERENT AERIAL PHOTOGRAPHIC
DISPLACEMENT THE PHOTOGRAPHIC IMAGE
MAY VARY FROM TRUE GROUND LOCATION



1977 ASCS Photography

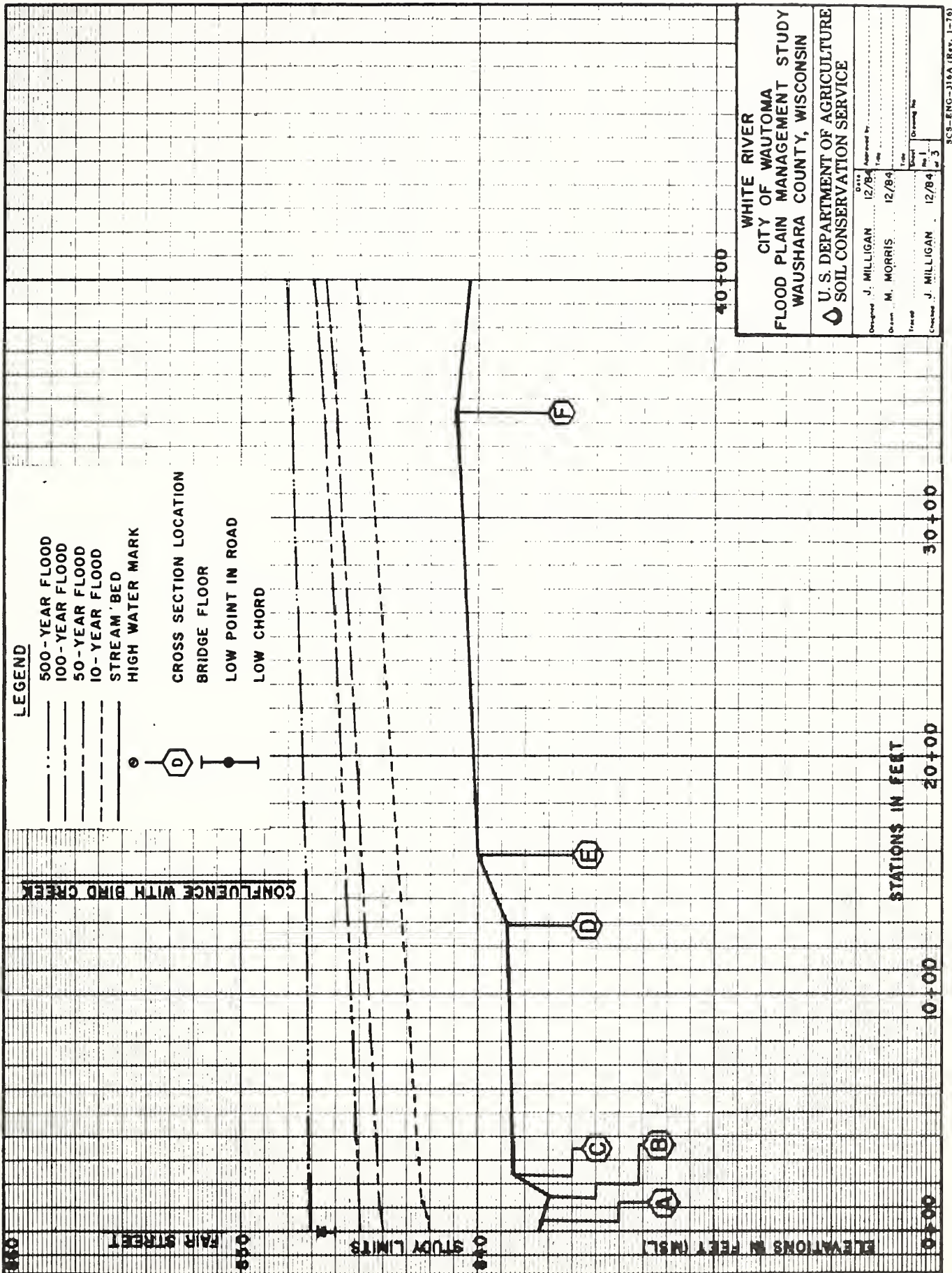
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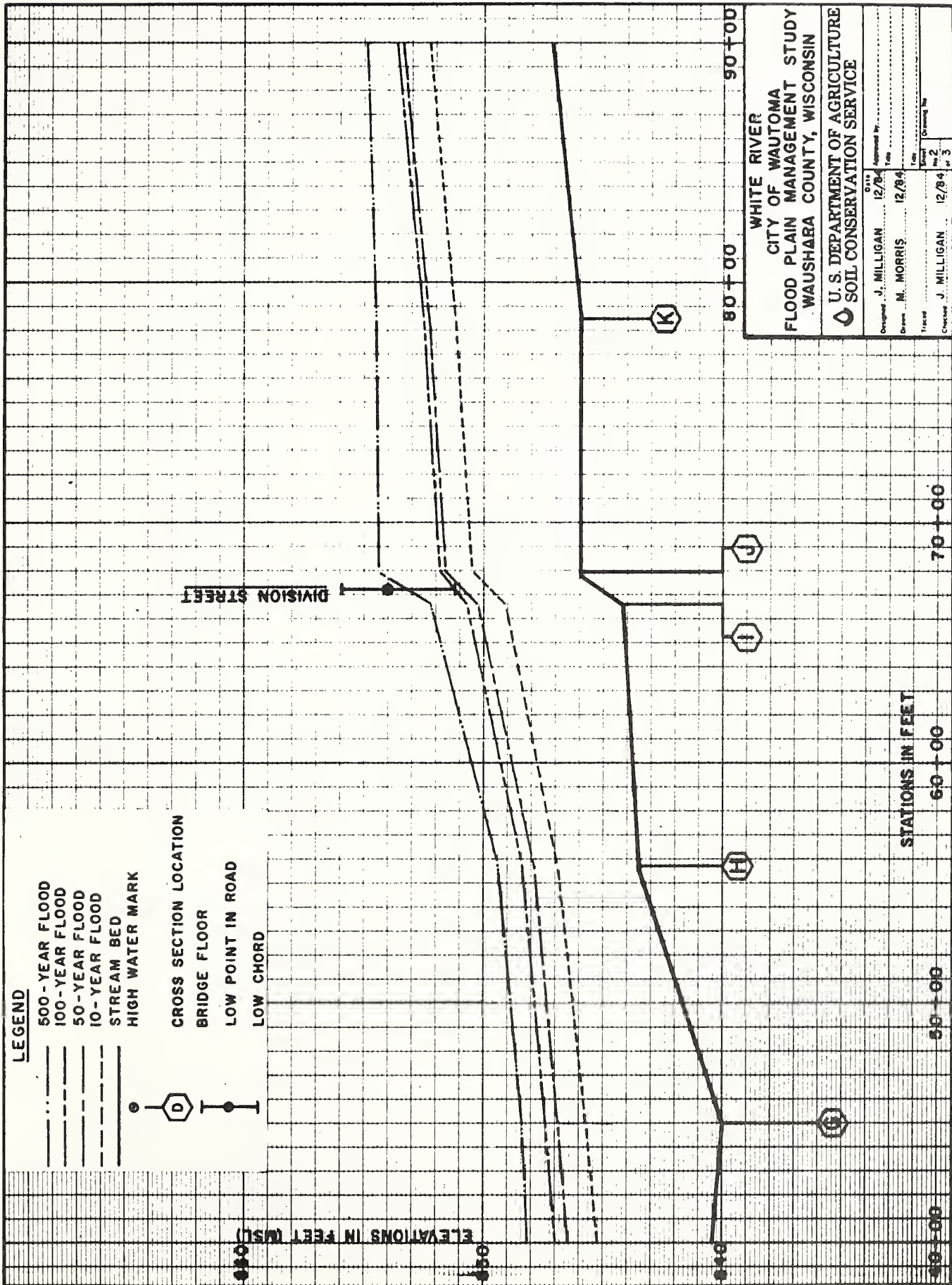
FLOOD HAZARD AREA

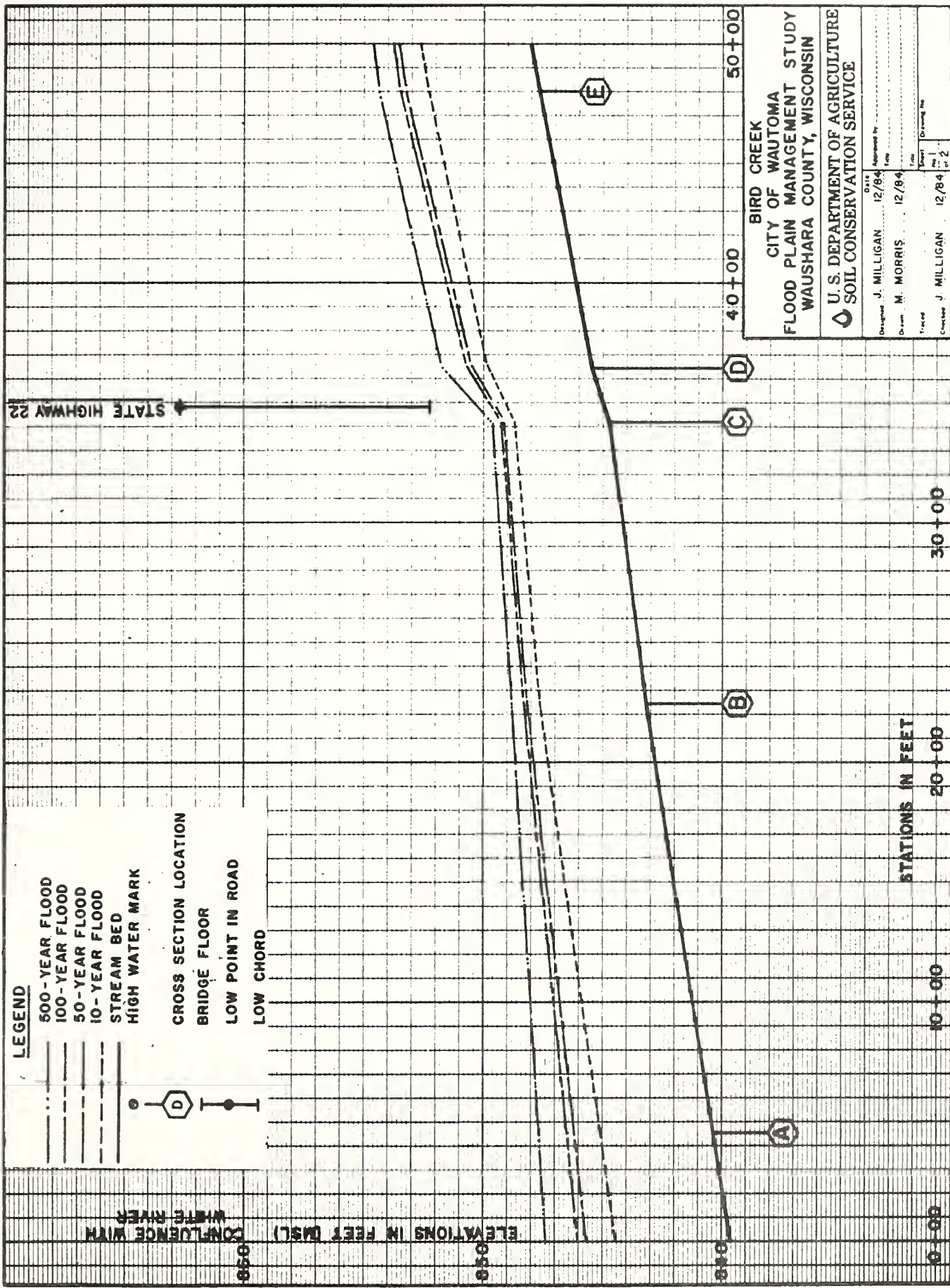
BIRD CREEK

Appendix B

FLOOD PROFILES







LEGEND

- 500-YEAR FLOOD
- 100-YEAR FLOOD
- 50-YEAR FLOOD
- 10-YEAR FLOOD
- STREAM BED
- HIGH WATER MARK

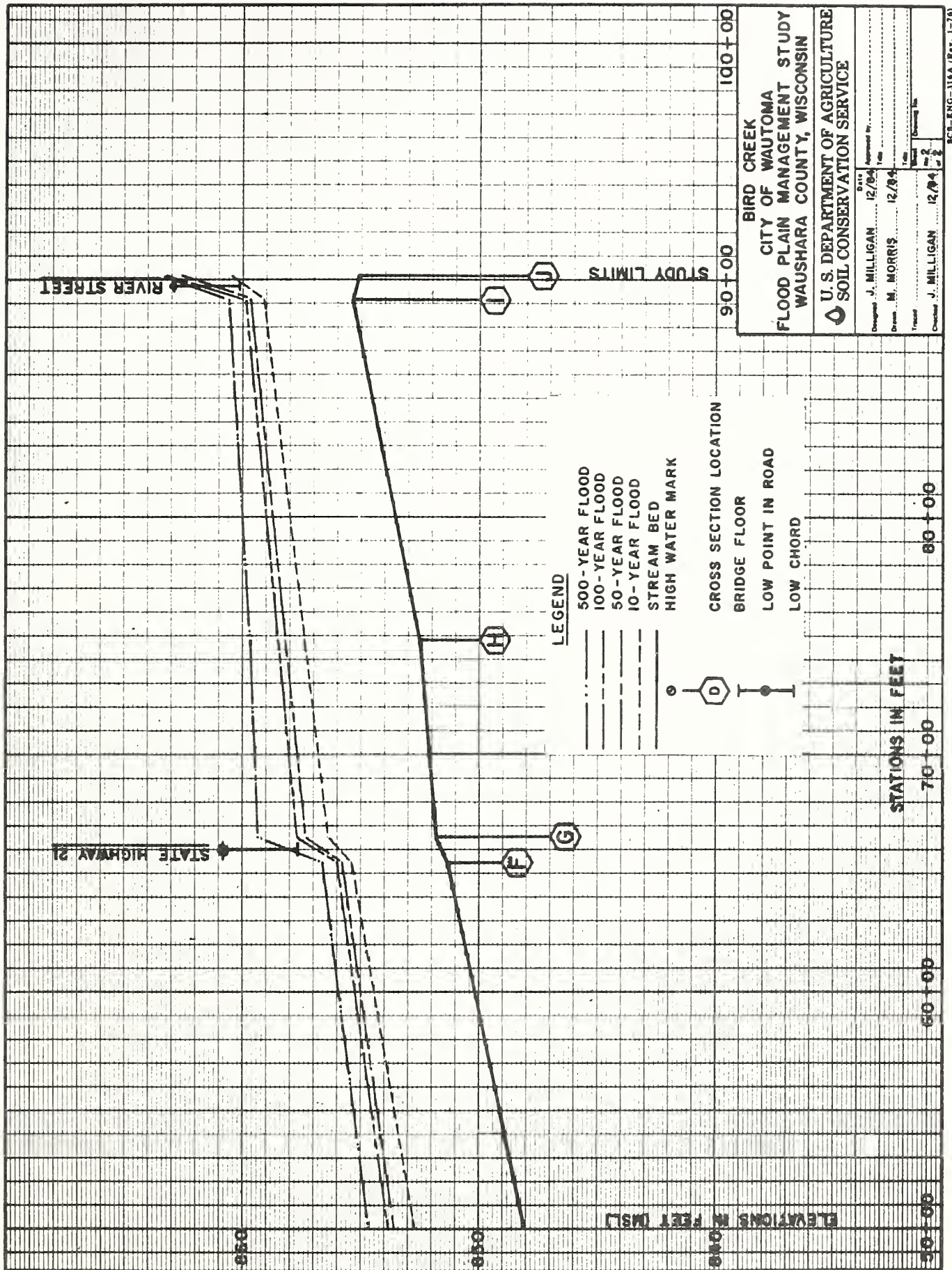
CROSS SECTION LOCATION

- BRIDGE FLOOR
- LOW POINT IN ROAD
- LOW CHORD

ELEVATIONS IN FEET (ASL)
CONFLUENCE WITH WHITE RIVER

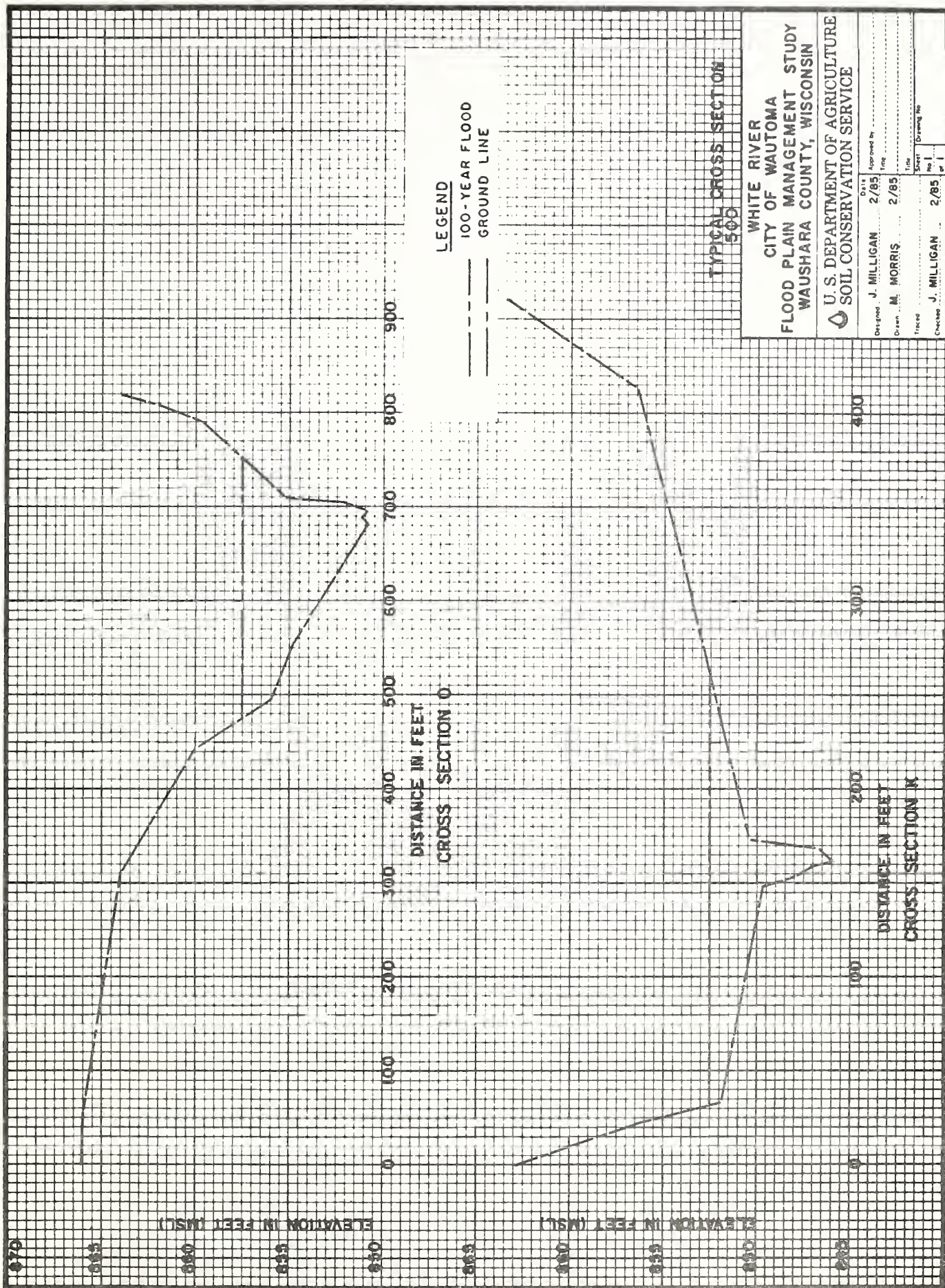
BIRD CREEK
CITY OF WAUTOMA
FLOOD PLAIN MANAGEMENT STUDY
WAUSHARA COUNTY, WISCONSIN
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

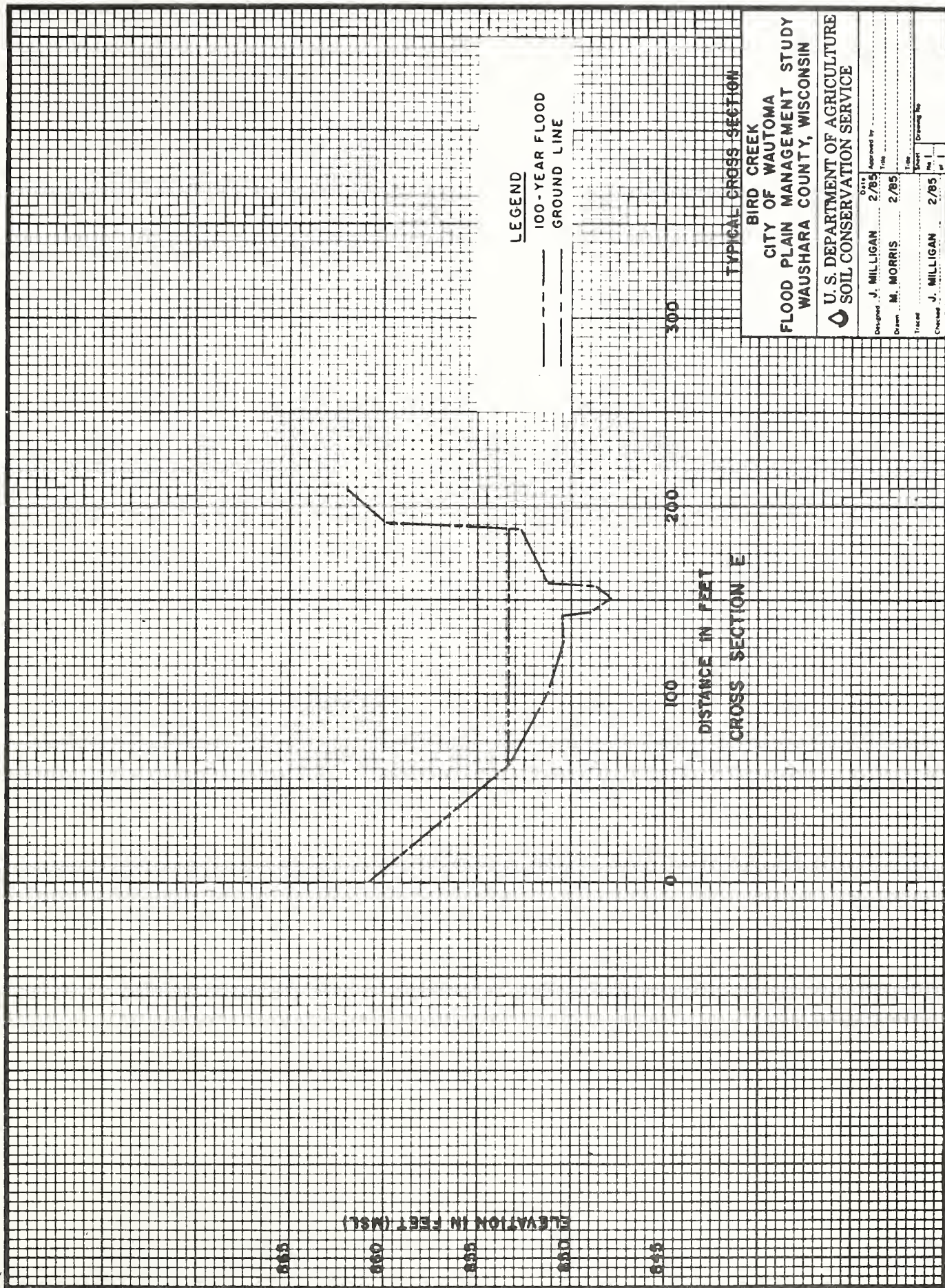
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Drawn by	M. MORRIS	Date	12/84
Checked by	J. MILLIGAN	Date	12/84
Approved by		Date	



Appendix C

TYPICAL SECTIONS





Appendix D

ELEVATION REFERENCE MARKS

ELEVATION REFERENCE MARKS

<u>Reference Mark</u>	<u>Elev. (MSL)</u>	<u>Description</u>
1	863.650	BML-97 USGS, 1934. A standard brass disk set in top of concrete post located about 1 pole north of old railroad station 34' west of centerline of track and 3' east of pole. NW 1/4, SW 1/4, Sec. 35, T19N, R10E.
2	867.47	BMM-97. A standard brass disk mounted vertically in the northwest corner wall of the old city hall building, located on the south side of Main Street approximately 32' west of the centerline of the White River. NE 1/4, SE 1/4, Sec. 34, T19N, R10E.
3	867.04	City of Wautoma Bench Mark No. 30. A railroad spike in south side of a 24" maple tree located on the southwest corner of Waushara County Historical Museum lawn.
4	870.655	City of Wautoma Bench Mark No. 35. A railroad spike in east side of an 18" tree stump located in the southwest corner of the intersection of State Highway 21 & 22 & Elm Street or Cummings Road.
5	862.65	City of Wautoma Bench Mark No. 36. The top of the southwest bolt in the top flange of water hydrant No. 29, as designated by the city map of hydrants, located in the northwest corner of the intersection of East Division and Fair Streets.
6	862.075	City of Wautoma Bench Mark No. 42. A railroad spike in the east side of a red pine tree (south pine in north clump of pines) located approximately 50' east of sewage plant clarifier.
7	862.65	City of Wautoma Bench Mark No. 43. A railroad spike in west side of elm tree located in the northeast corner of the Fair Street-Chicago Street intersection. This corner is the southwest corner of the NW 1/4 of Section 2, T18N, R10E.
8	868.69	City of Wautoma Bench Mark No. 46. A railroad spike in south side of a 15" maple tree in the north east corner of the intersection of State Highway 73 and State Highway 21-22.
9	846.71	SCS Temporary Bench Mark No. 1. The top southeast corner of the bridge headwall located approximately in the center of the southeast 1/4 of Section 3, T18N, R10E. (Dakota Township) (Town Road).

- | | | |
|----|--------|--|
| 10 | 859.67 | SCS Temporary Bench Mark No. 1e. The top surface of the northeast corner of the western most concrete mounting block of old abandoned electrical substation. Located in the SE 1/4, NE 1/4, Sec. 3, T18N, R10E. (Dakota Township). |
| 11 | 860.48 | SCS Temporary Bench Mark No. 2. The centerline of the north bridge headwall (curb) of small bridge crossing the White River in the alleyway immediately south of Main Street. |
| 12 | 864.48 | SCS Temporary Bench Mark No. 3. The top north end of a 15" cmp crossing River Street at the Highway 21, 22 intersection. |

Appendix E

TABULATION OF
WATER SURFACE ELEVATIONS
DISCHARGES
AND
FLOODWAY TABLES

Flooding Source		Discharge - Elevation									
Cross-section	Distance <u>1/</u>	10-year		50-year		100-year		500-year			
		Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL
<u>White River</u>		Town Road									
A	0	240	842.1	460	844.1	560	845.0	900	847.1	900	847.1
B	48	240	842.4	460	844.2	560	845.1	900	847.1	900	847.1
C	148	240	842.5	460	844.3	560	845.1	900	847.1	900	847.1
D	230	240	843.2	460	844.8	560	845.5	900	847.3	900	847.3
E	1290	220	843.4	415	844.9	510	845.6	815	847.3	815	847.3
F	1587	220	844.7	415	846.0	510	846.5	815	847.9	815	847.9
G	3435	220	845.7	415	846.9	510	847.4	815	848.4	815	848.4
H	4500	220	846.9	415	847.9	510	848.4	815	849.4	815	849.4
I	5574	220	848.5	415	849.7	510	850.2	815	851.1	815	851.1
	6660	Division Street									
	6720	220	850.5	415	851.6	510	851.8	815	854.4	815	854.4
J	6790	220	851.2	415	852.3	510	852.5	815	854.5	815	854.5
K	7850	220	852.3	415	853.4	510	853.7	815	854.9	815	854.9
L	9045	220	852.8	415	854.3	510	854.9	815	855.6	815	855.6
M	9095	River Street	854.3	415	855.7	510	856.2	815	857.2	815	857.2
N	9145	220	855.7	415	856.9	510	857.5	815	858.1	815	858.1
O	10025	220	856.1	415	857.3	510	857.9	815	858.7	815	858.7
P	10085	220	856.2	415	857.8	510	859.1	815	859.9	815	859.9
Q	10148	220	856.4	415	857.9	510	859.1	815	860.0	815	860.0
R	10595	220	856.2	415	862.3	510	862.3	815	863.0	815	863.0
S	10630	Alley	862.3	415	862.3	510	862.3	815	863.0	815	863.0
	10685	220	862.3	415	862.3	510	862.3	815	863.0	815	863.0
	10800	220	862.3	415	862.3	510	862.3	815	863.0	815	863.0
	10845	Main Street (Highway 73, 21)	862.3	415	862.3	510	862.3	815	863.0	815	863.0
	10890	220	862.3	415	862.3	510	862.3	815	863.0	815	863.0
		Dam	862.3	415	862.3	510	862.3	815	863.0	815	863.0

^{1/} Distance in feet from downstream study limit.

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WAUSHARA COUNTY WISCONSIN

DISCHARGE - ELEVATION DATA

WHITE RIVER

TABLE 1

Flooding Source		Discharge - Elevation							
Cross-section	Distance ^{1/}	10-year		50-year		100-year		500-year	
		Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL	Q CFS	Elev. MSL
<u>Bird Creek</u>									
	0		Confluence with the White River						
A	450	180	845.1	265	846.2	300	846.5	450	847.7
B	2246	180	847.7	265	848.2	300	848.3	450	848.8
C	3416	180	848.7	265	849.2	300	849.3	450	849.7
	3474		State Highway 22						
D	3645	180	849.8	265	850.5	300	850.7	450	851.8
E	4800	180	852.3	265	853.2	300	853.4	450	854.3
F	6545	180	855.4	265	855.8	300	856.0	450	856.6
	6600		State Highway 21						
G	6650	180	856.4	265	857.3	300	857.7	450	859.3
H	7478	180	857.4	265	858.2	300	858.5	450	859.7
I	8915	180	859.1	265	859.7	300	859.9	450	860.6
	8965		River Street						
J	9010	180	860.5	265	862.6	300	863.1	450	863.3

^{1/} Distance in feet from confluence with the White River.

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CITY OF WAUTOMA
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WAUSHARA COUNTY WISCONSIN

DISCHARGE - ELEVATION DATA

BIRD CREEK

TABLE 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE ¹	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)	DIFFERENCE (FT.)
<u>White River</u>							
A	48	183	648	0.86	845.0	845.0	0.0
B	148	234	463	1.21	845.1	845.1	0.0
C	230	431	1304	0.43	845.1	845.1	0.0
D	1290	370	984	0.57	845.5	845.5	0.0
E	1587	356	1012	0.5	845.6	845.6	0.0
F	3435	234	682	0.75	846.5	846.5	0.0
G	4500	162	584	0.87	847.4	847.4	0.0
H	5574	268	491	2.58	848.4	848.4	0.0
I	6660	167	322	1.58	850.2	850.2	0.0
J	6790	163	488	1.04	851.8	851.8	0.0
K	7850	227	410	1.25	852.5	852.5	0.0
L	9045	198	348	1.47	853.7	853.7	0.0
M	9145	63	149	3.42	854.9	854.9	0.0
N	10025	95	166	3.08	856.2	856.2	0.0
O	10148	278	779	0.65	857.5	857.5	0.0
P	10595	98	257	1.98	857.9	857.9	0.0
Q	10685	211	489	1.04	859.1	859.1	0.0
R	10800	59	254	2.01	859.1	859.1	0.0

¹/ Distance in feet from corporate limits

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CITY OF WAUTOMA
FLOODPLAIN MANAGEMENT STUDY
WAUSHARA COUNTY WISCONSIN

FLOODWAY DATA

WHITE RIVER

TABLE 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE ¹	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (M.S.L.)	WITHOUT FLOODWAY (M.S.L.)	DIFFERENCE (FT.)
<u>Bird Creek</u>							
A	450	152	400	0.75	846.5	846.5	0.0
B	2246	130	205	1.46	848.3	848.3	0.0
C	3416	148	223	1.34	849.3	849.3	0.0
D	3645	176	373	0.80	850.7	850.7	0.0
E	4800	131	288	1.04	853.4	853.4	0.0
F	6545	253	738	0.41	856.0	856.0	0.0
G	6650	503	887	0.34	857.7	857.7	0.0
H	7478	403	673	0.45	858.5	858.5	0.0
I	8915	854	1237	0.24	859.9	859.9	0.0
J	9010	1247	4697	0.06	863.1	863.1	0.0

^{1/} Distance in feet from corporate limits

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FLOODWAY DATA

BIRD CREEK

TABLE 2

Appendix F

INVESTIGATIONS AND ANALYSIS

Investigation and Analysis

The watersheds of Bird, Bower, and Soules Creeks are unique in that they are made up of highly permeable excessively and somewhat excessively drained sandy soils, and high water table shallow organic soils over sands in the lowlands. The soils are not very productive, therefore most of the land is idle or wooded. The above condition cause low peak runoff during summer storms. The largest recorded runoff events occurred during the winter (March 7, 1973). The staff gage at the Highway 21 culvert on Bird Creek has been operating from 1959 to the present. The highest peak of 190 cfs. occurred on March 7, 1973. A three-day rain of 7 to 9 inches occurred on June 22nd, 23rd, and 24th, 1940 resulting in water flowing about one foot deep over Elm Street. The hydraulic model indicates a flow of 800 cfs. would be necessary to produce this depth of flow. Technical Paper No. 50(7) indicates the one percent March snow pack contains eight inches of water. This has a potential of producing a runoff greater than the June 1940 rainfall, given a fast thaw or warm rain with a thaw.

The flows picked for the floodplain deliniation of the one percent chance regional flood are 300 cfs. for Bird Creek and 500 cfs. for the White River. The 300 cfs. for Bird Creek reflects the high confidence level of the gage analysis and the potential snowmelt spring flood. The 500 cfs. on the White River corresponds to the recalled flood events and the potential runoff from snowmelt or rainfall on frozen ground. No significant flooding occurs at these flows on either stream.

Appendix A contains the photomaps showing the limits of the floodplain.
Appendix B contains the flood profiles.

Appendix G

GLOSSARY

GLOSSARY

CHAPTER NR. 116, WISCONSIN'S FLOODPLAIN MANAGEMENT PROGRAM NR. 116.03 DEFINITIONS

Channel. A channel is a natural or artificial watercourse with definite bed and banks to confine and conduct the normal flow of water.

Department. Department refers to the State of Wisconsin Department of Natural Resources.

Encroachment. An encroachment is any fill, structure, building, use, accessory use, or development in the floodway.

Encroachment/Floodway Lines. Encroachment/floodway lines are limits of obstruction to floodflows. These lines are on both sides of and generally parallel to the river or stream. The lines are established by assuming that the area landward (outside) of the encroachment/floodway lines will be ultimately developed in such a way that it will not be available to convey floodflows.

Equal Degree of Hydraulic Encroachment. The effect of any encroachment into the floodway must be computed by assuming an equal degree of hydraulic encroachment on the other side of a river or stream for a hydraulic reach. This computation assures that property owners up, down, or across the river or stream will have the same rights of hydraulic encroachment. Encroachments are analyzed on the basis of the effect upon hydraulic conveyance, not upon the distance the encroachment extends into the floodway. Also see: Hydraulic Reach.

Flood. A general and temporary condition of partial or complete inundation of normally dry land areas caused by the overflow or rise of rivers, streams, or lakes.

Flood Frequency. The term flood frequency is a means of expressing the probability of flood occurrences and is generally determined from statistical analyses. The frequency of a particular floodflow is usually expressed as occurring, on the average, once in a specified number of years. Any particular floodflow could, however, occur more frequently than once in any given year.

Flood Fringe. The flood fringe is that portion of the floodplain outside of the floodway, which is covered by floodwaters during the regional flood; it is generally associated with standing water rather than rapidly flowing water.

Floodplain. The floodplain is the land which has been or may be hereafter covered by floodwater during the regional flood. The floodplain includes the floodway and the flood fringe.

Floodplain Management. Floodplain management involves the full range of public policy and action for insuring wise use of floodplains. It includes everything from the collection and dissemination of flood control information to actual acquisition of floodplain lands; and the enactment and administration of codes, ordinances, and statutes for land use in the floodplain.

Flood Proofing. Flood proofing involves any combination of structural provisions, changes, or adjustments to properties and structures subject to flooding, primarily for the purpose of reducing or eliminating flood damage to properties, water and sanitary facilities, structures and contents of buildings in flood hazard areas.

Flood Protection Elevation. The flood protection elevation shall correspond to a point 2 feet of freeboard above the water surface profile associated with the regional flood and the official floodway lines. Also see: Freeboard.

Floodway. The floodway is the channel of a river or stream and those portions of the floodplain adjoining the channel required to carry and discharge the floodwater or floodflows associated with the regional flood.

Freeboard. Freeboard is a factor of safety usually expressed in terms of a certain amount of feet above a calculated flood level. Freeboard compensates for the many unknown factors that contribute to flood heights greater than the height calculated. These unknown factors include, but are not limited to, ice jams, debris accumulation, wave action, obstruction of bridge openings and floodways, the effects of urbanization on the hydrology of the watershed, loss of flood storage areas due to development and aggradation of the river or streambed.

High Flood Damage Potential. High flood damage potential is associated with any danger to life or health and any significant economic loss to a structure or building or its contents.

Hydraulic Floodway Lines. Hydraulic floodway lines shall delineate the channel of the river or stream and those portions of the adjoining floodplains which are reasonably required to carry and discharge the regional floodflow without any measurable increase in flood heights.

Hydraulic Reach. A hydraulic reach along a river or stream is that portion of the river or stream extending from one significant change in the hydraulic character of the river or stream to the next significant change. These changes are usually associated with breaks in the slope of the water surface profile, and may be caused by bridges, dams, expansion and contraction of the waterflow, and changes in streambed slope or vegetation.

Levee. A levee is a continuous dike or embankment of earth constructed parallel to a river or stream to prevent flooding of certain areas of land.

Official Floodway Lines. Official floodway lines are those lines which have been adopted by the county, city, or village, approved by the department, and which are shown on the official floodplain zoning maps and used for regulatory purposes.

Regional Flood. The regional flood is a flood determined to be representative of large floods known to have generally occurred in Wisconsin and which may be expected to occur on a particular stream because of like physical characteristics. The regional flood is based upon a statistical analysis of streamflow records available for the watershed and/or an analysis of rainfall and runoff characteristics in the general watershed region. The flood frequency of the regional flood is once in every 100 years; this means that in any given year there is a 1 percent chance that the regional flood may occur. During a typical 30-year mortgage period, the regional flood has a 26 percent chance of occurring.

Structure. A structure is any manmade object with form, shape, and utility, either permanently or temporarily attached to or placed upon the ground, riverbed, streambed, or lakebed.

Watershed. A watershed is a region or area contributing ultimately to the water supply of a particular watercourse or body of water.

Water Surface Profile. The water surface profile is a graphical representation of the height of the water surface throughout a county, city, or village based upon a certain flow passing through the river or stream. A water surface profile based upon flows occurring during a regional flood is used in regulating the floodplain areas.

Appendix H

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